A Dynamic Publish-subscribe Overlay Network

Yunhua Koglin    Elisa Bertino
CERIAS and Department of Computer Science
Purdue University

Motivations

• Large-scale publish-subscribe overlay networks
• Connectivity is not reliable
• Frequent topological reconfiguration

Our goal

• Increase event delivery while at the same time, decrease number of messages generated

Important factors

• Different system sizes (number of brokers);
• Different rates of link failure;
• Different routing information propagation rates.

Mathematical Models

• Probability approach
  – A broker randomly chooses subset of its links to forward an event;
  – A broker forwards an event at most once.

\[
c_i = \frac{N - C_{i-1}}{N} c_{i-1} [Lp] \frac{L - 1}{L}
\]
\[
C_i = C_{i-1} + c_i \quad \text{if } i > 0
\]

• Ripple propagation
  – A broker propagates its subscription information h hops away;
  – A broker forwards an event only if its neighbors asked this event;